

EEE BRANCH REVIEW

DATE: IN 5/8/79 OUT 11/13/79 IN \_\_\_\_\_ OUT \_\_\_\_\_  
FISH & WILDLIFE ENVIRONMENTAL CHEMISTRY EFFICACY

FILE OR REG. NO. 10182-EUP-RT

PETITION OR (EXP. PERMIT NO.) 9G2200/9H5217

DATE DIV. RECEIVED 4/23/79

DATE OF SUBMISSION 4/18/79

DATE SUBMISSION ACCEPTED \_\_\_\_\_

TYPE PRODUCT(S):(I), D, H, F, N, R, S Insecticide

DATA ACCESSION NO(S). 098233/097679-5

PRODUCT MGR. NO. 12

PRODUCT NAME(S) ACTELIC 7E (pirimiphos-methyl)

COMPANY NAME ICI

SUBMISSION PURPOSE E.U.P. - amend previously submitted EUP to revise  
product chemistry section

CHEMICAL FORMULATION 0-[-2(diethylamino)-6-methyl-4-pyrimidinyl]  
0,0-dimethyl phosphorothioate 82.6%



2067765

100.0 Pesticidal Use

To control insects in stored corn, rice, grain sorghum and wheat.

100.1 Application Methods/Directions

Corn, Wheat and Grain Sorghum

Apply 0.40 to 0.55 pints of Actellic 7E in 5 gallons of water to each 30 tons (60,000 lbs) of grain. Treated corn may be used only as feed for livestock and poultry.

Rice: Apply 0.65-1.0 pints of Actellic 7E in 5 gallons of water to each 30 tons (60,000 lbs.) of rice.

100.3 Precautionary Labeling

Keep out of lakes, streams and ponds. Do not contaminate water by cleaning of equipment or disposal of waste.

100.4 Proposed EUP Program

100.4.1 Objectives

- (a) To evaluate the performance of Actellic 7E Insecticide against 10 different destructive pests which attack stored corn, rice, grain sorghum and wheat.
- (b) To determine the most effective use pattern. It is expected that most tests will incorporate Actellic as a protectant using various application techniques (spray, drip, etc.). Additional evaluations will be made using Actellic as a surface spray and for warehouse disinfection.
- (c) To gather residue, crop quality and other appropriate information.

100.4.2 Duration/Date/Amount Shipped

This EUP was intended to cover the period August 1979 to August 1980. The registrant proposes to use 5000 lbs. active ingredient or 715 gallons of Actellic 7E.

100.4.3 Application Procedures

A maximum of 167,425 tons of corn, 24,500 tons of rice, 41,522 tons of sorghum and 167,434 tons of wheat will be treated as described under 100.1 above.

100.4.4 Target Pests

Coleoptera

Confused flour beetle	<u>Tribolium confusum</u>
Flat grain beetle	<u>Cryptolestes pusillus</u>
Granary weevil	<u>Sitophilus granarius</u>
Merchant grain beetle	<u>Oryzaephilus mercator</u>
Maize weevil	<u>S. zeamais</u>
Red flour beetle	<u>T. castaneum</u>
Sawtoothed grain beetle	<u>O. surinamenis</u>

Lepidoptera

Angoumois grain moth	<u>Sitotroga cerealella</u>
Indian meal moth	<u>Plodia interpunctella</u>

100.4.5 Geographical Site Features

Tests with stored corn will be carried out in 28 states:

State	ai (lbs)	ACTELIC (gal)	Grain Treated (tons)
AL	2	3	1,750
CA	7	1	584
CO	14	2	1,167
DE	7	1	584
FL	14	2	1,167
GA	56	8	4,667
IL	322	46	26,834
IN	168	24	14,000
IA	364	52	30,334
KS	49	7	4,084
KY	35	5	2,917
MD	14	2	1,167
MI	56	8	4,667
MN	175	25	14,583
MS	7	1	584
MO	84	12	7,000
NB	182	26	15,167
NY	14	2	1,167
NC	49	7	4,084
ND	7	1	584
OH	105	15	8,750
PA	35	5	2,917
SC	14	2	1,167
SD	70	10	5,833
TN	21	3	1,750
TX	35	5	2,917
VA	14	2	1,167
WI	70	10	5,833
	2,009	287	167,425

Tests with rice will involve five states:

State	ai (lbs)	ACTELLIC (gal)	Grain Treated (tons)
AR	154	22	7,700
CA	91	13	4,550
LA	119	17	5,950
MS	28	4	1,400
TX	98	14	4,900
	<u>490</u>	<u>70</u>	<u>24,500</u>

Tests with sorghum will be conducted in eleven states:

State	ai (lbs)	ACTELLIC (gal)	Grain Treated (tons)
AZ	7	1	584
AK	7	1	584
CA	7	1	584
CO	14	2	1,167
KS	112	16	9,334
MS	14	2	1,167
NB	63	9	5,250
NM	7	1	584
OK	21	3	1,750
SD	7	1	584
TX	238	34	19,934
	<u>497</u>	<u>71</u>	<u>41,522</u>

Tests with wheat will be carried out in thirty-four states as follows:

State	ai (lbs)	ACTELLIC (gal)	Grain Treated (tons)
AL	7	1	584
AZ	7	1	584
AR	14	2	1,167
CA	28	4	2,334
CO	63	9	5,250
GA	7	1	584
ID	42	6	3,500
IL	49	7	4,084
IN	42	6	3,500
KS	371	53	30,919
KY	7	1	584
MD	7	1	584
MI	28	4	2,334

MN	84	12	7,000
MS	7	1	584
MO	42	6	3,500
MT	140	20	11,667
NB	91	13	7,584
NM	14	2	1,167
NY	7	1	584
NC	7	1	584
ND	294	42	24,500
OH	49	7	4,084
OK	189	27	15,750
OR	35	5	2,917
PA	7	1	584
SC	7	1	584
SD	84	12	7,000
TN	7	1	584
TX	161	23	13,417
VT	7	1	584
VA	7	1	584
WA	91	13	7,584
WY	1	7	584
	<u>2,009</u>	<u>287</u>	<u>167,434</u>

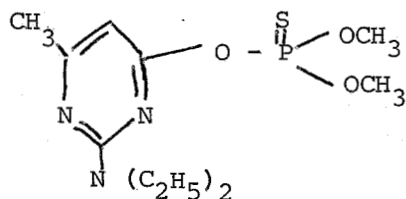
Each crop will receive a single application of Actellic 7E.  
Corn, sorghum and wheat will be treated at 6-8 ppm, equivalent to 0.36-0.48 lbs. a.i. per 30 tons while rice will receive 15 ppm or 0.06-0.90 lbs. a.i. per 30 tons.

101.0 Chemical and Physical Properties

101.1 Chemical Name  
0-[2-(diethylamino)-6-methyl-4-pyrimidinyl]0,0-dimethyl phosphorothioate

101.2 Common Name  
Pirimiphos-methyl

101.3 Structural Formula



101.4 Molecular Weight

101.5 Physical State

Color: pale yellow liquid

Odor: strong, unpleasant smell

101.6 Solubility

NA

102.0 Behavior in the Environment

The rate of degradation of pirimiphos on stored products is usually slow, dependent upon the amount of moisture content of the grain. At a treatment rate of 4 or 8 ppm to stored wheat, only 20% of the chemical was hydrolyzed in eight months (when the moisture content averaged 13%). Up to 86% was hydrolyzed over the same period at an average of 19% moisture content. Grains which are treated with pirimiphos are stored in warehouses where conditions are carefully controlled.

102.2 Water

Pirimiphos is rapidly hydrolyzed in water. At a pH of 6.5 in distilled water the product was rapidly hydrolyzed, with a half life of roughly 3 days.

The chart below indicates the times required to obtain 50% hydrolysis of pirimiphos at 25°C and at various pH levels:

<u>pH*</u>	<u>t1/2 (days)</u>
5.8	7.5
6.25	22.3
7.1	35
7.75	23.5
8.5	11.6

\*these levels include those most likely to be encountered in soils.

In sterile pond and river waters 50% degradation was obtained in less than one day in sunlight as compared with three days in the dark.

102.4 Animal

Livestock metabolism and residue studies previously submitted (Acc. No. 097674) are summarized below:

- (a) Pirimiphos-methyl is extensively metabolized and excreted by livestock so that residues in meat and milk are very small (0.003 ppm, 0.18 ppm in lactating goats).

- (b) From cows, milk contained 0.04 ppm pirimiphos-methyl (75% of which could be separated from the fat and protein fraction by extraction).
- (c) Groups of three cows, fed 0, 5, 15 and 50 ppm pirimiphos-methyl did exceed 0.02 ppm in milk samples.
- (d) Groups of four pigs fed 0, 3, 10 and 34 ppm pirimiphos-methyl for up to 29 days showed no residues in kidney, liver, lung, heart or muscle.
- (e) Hens given an equivalent of 4 ppm in the daily diet for 28 days did not exceed 0.04 ppm pirimiphos-methyl in eggs or 0.3 ppm in muscle.
- (f) A group of three hens fed at an equivalent to 32 ppm in the diet for 7 days resulted in residues of up to 0.15 ppm in eggs and 0.41 ppm in muscle.
- (g) Groups of laying hens were maintained at 28 days on diets containing 0, 4, 12, and 40 ppm pirimiphos-methyl. At all but the highest level, residues in eggs were below 0.01 ppm. At the 40 ppm level residues in the egg yolk reached a plateau of 0.03-0.04 ppm after 7 days.

Residues in stored grain (corn, rice, grain sorghum and wheat) are expected to be below the proposed temporary tolerance.

Pirimiphos-methyl degrades to eight different products. These products have been identified as being present in soil, water and rat/dog tissues. Five have been identified in soil, four in water and two in animals. The LD<sub>50</sub> values to fasted females for the numbered compounds is as follows:

Compound No.	Mg/Kg. (C.L)
I (pirimiphos-methyl)	2050 (1840-2260)
II	800-1600
III	unstable compound
IV	800-1600
V	2093 (1840-2380)
VI	<4000
VII	545 (470-625)
VIII	706 (634-780)
IX	1105 (100-1220)

#### 103.0 Toxicological Properties

##### 103.1.1 Mammal

103.1.2 Bird

<u>Species</u>	<u>Test</u>	<u>Status</u>
	<u>Acute Oral LD<sub>50</sub>*</u>	
Japanese quail	140 mg/kg	Invalid
Pigeon	<800 mg/kg	Invalid
Greenfinch	200-400 mg/kg	Invalid

\*using technical grade pirimiphos-methyl

<u>Species</u>	<u>Test</u>	<u>Status</u>
	<u>8-day Dietary LC<sub>50</sub>* (C.L.)</u>	
Mallard duck	633 ppm (453-883 ppm)	Core
Bobwhite quail	207 ppm (106-407 ppm)	Core

\*using technical grade pirimiphos-methyl

103.1.3 Fish

<u>Species</u>	<u>Test</u>	<u>Status</u>
	<u>96 hr. LC<sub>50</sub> (C.L.)</u>	
Rainbow trout	0.40 ppm (0.36 - 0.45 ppm)	Core
Fathead minnow	2.5 ppm (2.4 - 2.7 ppm)	Core
Rainbow trout	1.2 ppm (0.92 - 1.5 ppm)	Core
Bluegill sunfish	2.9 ppm (2.6 - 3.1 ppm)	Core

103.1.4 Aquatic Invertebrates

	<u>Species</u>	<u>Test</u>	<u>Status</u>
		<u>48 hr. LC<sub>50</sub> (C.L.)</u>	
(Tech)	<u>Daphnia magna</u>	0.21 ug/l (0.15 - 0.31 ug/l)	Core
(E.C)	<u>Daphnia magna</u>	0.11 ug/l (0.08 - 0.15 ug/l)	Supplementary

104.0 Hazard Assessment

104.1 Discussion

The registrant proposes use of Actellic 7E to treat 401,000 tons of stored grains to control various pest insects. Because the grains (corn, grain sorghum, wheat and rice) are inside granaries and warehouses, the chances of contamination of fish and wildlife are negligible.



104.1.1 Likelihood of Exposure to Nontarget Organisms

Since treatment of grains will be inside storage facilities, the likelihood of nontarget exposure is nil. All grains will be treated post harvest inside to control in a variety of insect pests.

The product is slightly to moderately toxic to avian species and highly toxic to aquatic organisms (Daphnia spp. and rainbow trout). Because of the use pattern, however, it is not expected to result in exposure to these species.

104.1.2 Endangered Species Considerations

No endangered species have been identified as being associated with the proposed use pattern.

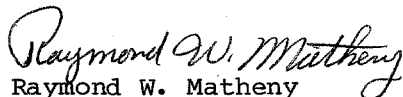
104.1.3 Adequacy of Toxicity Data

Prior to future registration consideration the registrant must submit an avian oral LD<sub>50</sub> test for either a wild waterfowl (mallard duck) or an upland game species (bobwhite quail, ringtail pheasant). All other fish and wildlife data have been submitted. Note, however, that further data may be required depending upon the results of the above and any other environmental fate data submitted.

107.0 Conclusions

The Ecological Effects Branch has no objection to the issuance of this EUP for these of 715 gallons of Actellic® 7E (5000 lbs. a.i.) to treat the specified tonnage of grains (corn, rice, grain sorghum and rice) in the various locations identified. The registrant has submitted sufficient data to show that the product, under the stated use pattern, should not cause adverse environmental effects.

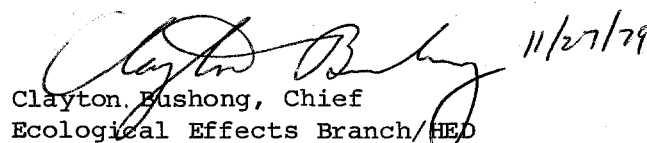
Obviously the dates of the EUP will vary since starting date was originally August 1, 1979. See Sec. 104.1.3 concerning data needed to support registration.

  
Raymond W. Matheny

Ecological Effects Branch 11/13/79



David Coppage, Section Head  
Ecological Effects Branch

 11/27/79  
Clayton Bushong, Chief  
Ecological Effects Branch/HED